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the Copernican system is built, and in the teeth of the evolution of his own race during his own life, Dr. Wythe dare not only assert that "transmutation is impossible," but brands with the name of "Atheist," such men as Spencer, Wallace, Tyndall, Huxley, Darwin, Quatrefages, Cope and Draper, men whose reverence for all that is good, and honest hatred of all that is evil or hypocritical is evident in every line of their writings. Dr. Wythe does not know, or forgets, the fact that the teachers of a newer and better creed are always called atheists by the bigoted adherents of an older and worse one. His list of dualist naturalists consists in great part of the mighty of the past, and of men whose laurels have been won in non-biological fields, and whose claim to the title of biologist consists chiefly in their conservative opposition to the lessons biology teaches.

Then comes the old argument that, if transmutation be true, in the struggle for existence, all the lower should have been changed to higher forms. By the same reasoning, if civilization be true, all savages should have reached the highest civilization. But savages exist, and Dr. Wythe will not deny that they are of the same species with himself. Ergo, civilization is not true.

We refer, as a curiosity, to the paragraph on "spiral motion or fiber" *(sic)*, which the author declares to be a "wonderful thing." Even spiral motion without "fiber" is a "wonderful thing" according to the definition given, which is as follows; "For all circular movement two forces are needed, centripetal and centrifugal, but for a spiral, a progressive movement of the centrifugal point is also necessary." When we read the list of these movements we increase our wonder. They are "cyclosis and spiral fibers of plants, phyllotaxis, spiral forms in shells and radiates, the spiral movement of the moon and planets in space, and many spiral nebulæ."

The classification of our author is better than might be expected, indeed, in some points it is that of the "atheistic" Haeckel, but it is significant that the echinoderms are retained among the radiates, that the troublesome types of Vermes are ignored, and that *man is not included in the vertebrates.* Shades of Cuvier and Agassiz, what think ye of him who claims to be your follower?

DARWIN'S FORMATION OF VEGETABLE MOLD THROUGH THE ACTION of WORMS.[1]—This, the last of Mr. Darwin's works, is characterized by the same patient observation, ingenuity in methods of research, cautious spirit and powers of generalization, which may be seen in his more important works. The startling conclusions of this book are gradually approached, and each step is so surely taken that the reader at the end is convinced that the results derived from so many facts must be well founded.

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[1] *The International Scientific Series. The Formation of Vegetable Mould through the action of Worms, with observations on their habits.* By CHARLES DARWIN LL.D., F.R.S. With illustrations. New York, D. Appleton & Co., 1882. 12mo, pp. 326. $1.50.

In 1837, in a short paper on the "Formation of Mould," the author showed "that small fragments of burnt marl, cinders, &c., which had been thickly strewed over the surface of several meadows, were found, after a few years, lying at the depth of some inches beneath the turf, but still forming a layer." This was due "to the large quantities of fine earth continually brought up to the surface by worms in the form of castings." This subject has been faithfully followed up through a period of over forty years.

After describing the structure and habits of the earth-worm, Darwin shows that they burrow both by pushing away the earth on all sides, the pharynx being, as Perrier had shown, pushed forwards into the end of the head, causing it to swell out, and thus push the earth away on all sides, while also the worm swallows the dirt, which passes through the body. In this way worms may penetrate to a depth of from three to eight feet. By their great numbers and continued activity earth-worms bury small, and often great stones left on the surface. In many parts of England it is estimated that a weight of more than ten tons of dry earth annually passes through their bodies and is brought to the surface on each acre of land; so that the whole superficial bed of vegetable mold passes through their bodies in the course of every few years. Moreover they triturate and thus disintegrate particles of rock, and thus aid in the denudation of land. By their action ancient earthworks and tumuli are lowered, and old ruins, pavements and stone walls are either buried or perceptibly lowered, and thus the humble earth-worm acts in the end as a not unimportant geological agent.

THE MICROSCOPE IN MEDICINE, BY LIONEL S. BEALE, M.B, F.R.S.[1]—This is the fourth edition of a well-known and valuable work, by one of the most practiced microscopists of the United Kingdom.

The introduction consists of an able plea for encouragement and assistance in the scientific investigation of disease, and is followed by nearly 200 pages devoted to a description of the apparatus necessary for the examination of objects of clinical importance, the practical operations required for their demonstration, and the methods of recording the appearances observed.

In this portion of the work full directions are given for hardening, boiling, freezing, rendering transparent or opaque, preserving, mounting, coloring, cutting sections, injecting, and other processes necessary for the examination of the various kinds of

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[1] *The Microscope in Medicine*, by LIONEL S. BEALE, M.B., F.R.S., Fellow of the Royal College of Physicians, etc., Fourth Edition, pp. 528. Illustrations more than 500, most of which have been drawn on wood by the author. London, J. and A. Churchill; Philadelphia, Lindsay and Blakiston.